10-9-2019

National Laboratory Day

Dan Ginosar

Critical Materials Institute

AN ENERGY INNOVATION HUB

National Laboratory Day

October 9, 2019

Dan Ginosar

CMI Deputy Focus Area Lead

Mission & Strategy

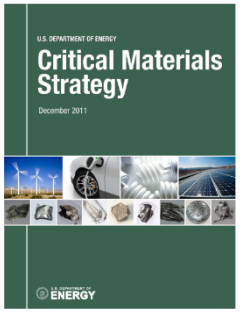
Mission:

Accelerate the development of technological options that assure supply chains of materials essential to clean energy technologies – enabling innovation in US manufacturing and enhancing energy security.

Critical materials (a) provide essential and specialized properties to advanced products or systems, (b) have no easy substitutes, and (c) are subject to supply risk.

Strategy:

- Diversify our sources;
- Develop substitutes to the existing materials;
- Drive better use of the existing supplies through efficient manufacturing, recycling and re-use.



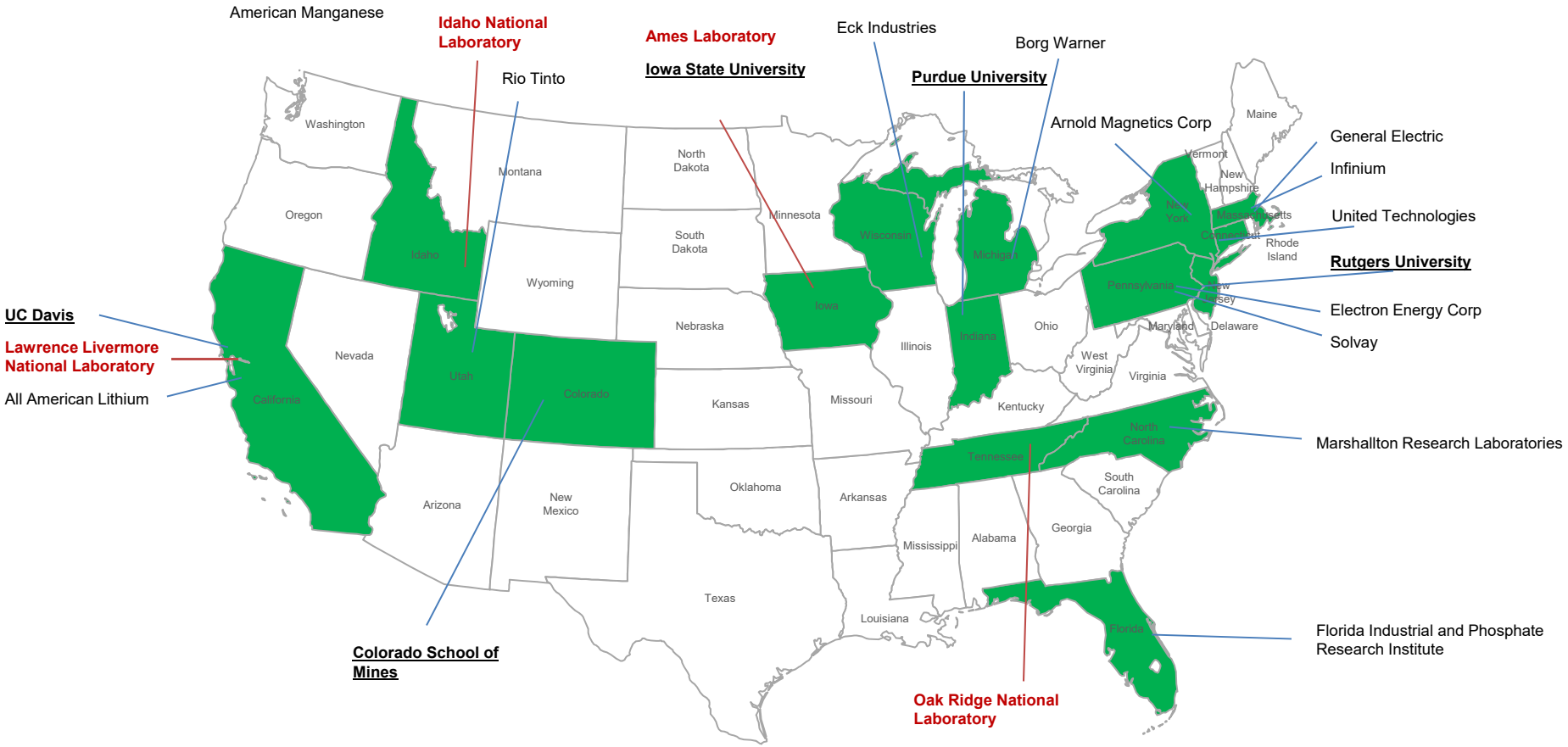
cal Materials in Energy Systems

	REEs *	Li	Co	C**	Ga	In	Mn	V	PGM
Vehicles/ Motors	X	X	X	X			X	X	X
Storage		X	X	X			X	X	
Solar/ Semi-conductors					X	X			
Catalysts	X								X
Lighting	X				X	X			
Nuclear	X		X			X			
Wind	X								

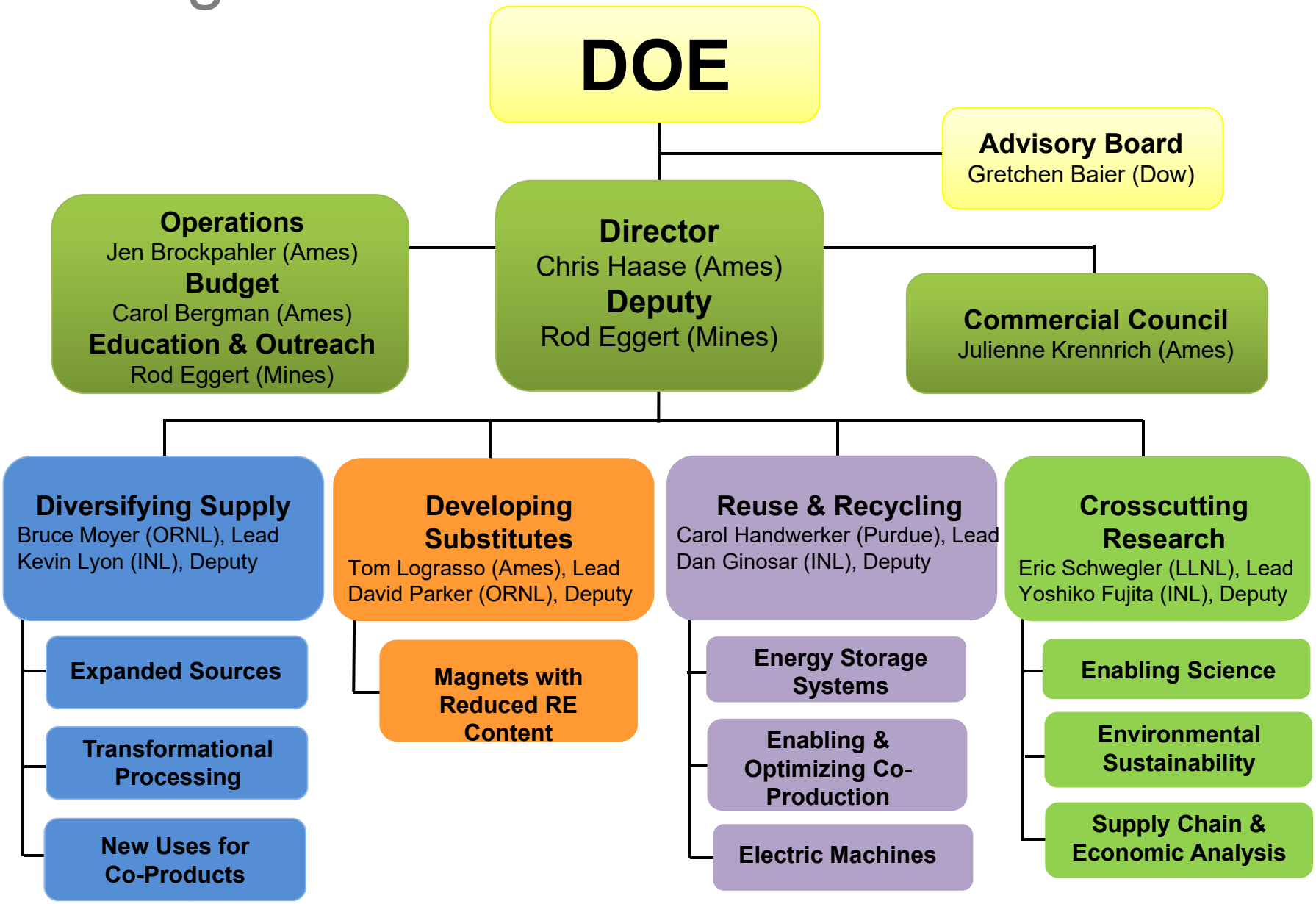
- = Selected rare earths: Nd, Pr, Dy, Sm (magnets); La, Ce (catalysts)

** = Battery-grade graphite

CMI: One integrated team with complementary capabilities



CMI Organization



Accomplishments

287
Refereed
Publications

120
Invention
Disclosures

350
CMI Participants*

56
Patent
Applications

10
Awarded Patents

8
Technology
Licenses

4
R&D 100 Awards

50
CMI Affiliates*

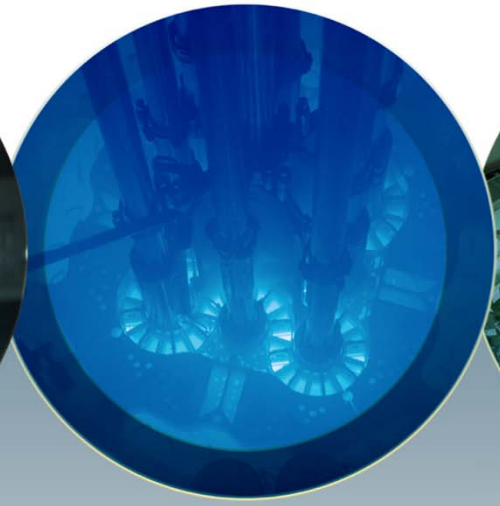
25
CMI Team
Members*

* - since inception

is Positioned to Address the World's Energy and curity Challenges

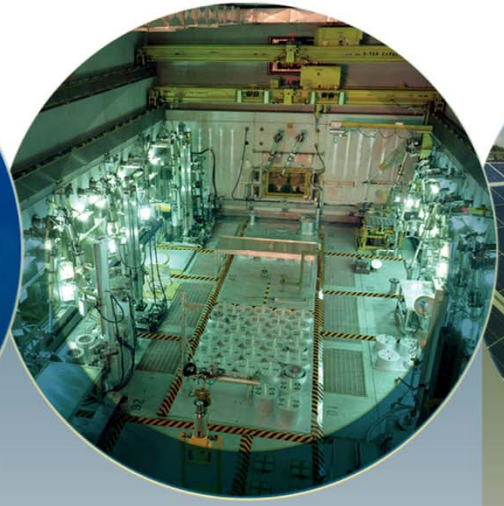
Nuclear S&T

vanced reactor design
l optimization
clear fuels and
terials
el cycle technologies
nt water reactor fleet
tainability



Advanced Test Reactor

- Steady state neutron irradiation of materials and fuels
  - Naval Nuclear Propulsion Program
  - Industry
  - National laboratories and universities



Materials and Fuels Complex

- TREAT – Transient testing
- Analytical laboratories
- Post-irradiation examination
- Advanced characterization
- Fuel fabrication
- Space nuclear power and isotope technologies

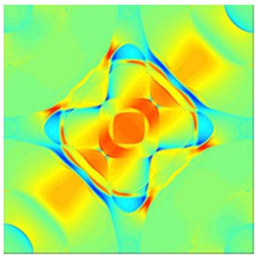
Energy and Environment S&T

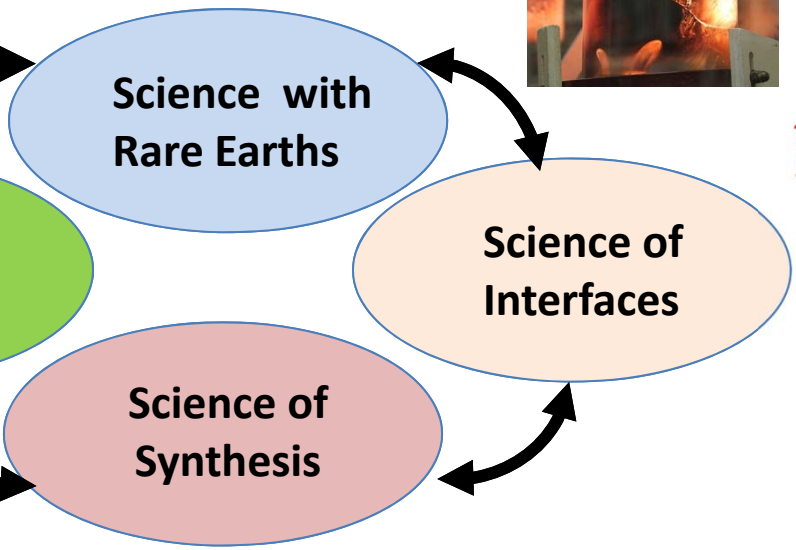
- Advanced transportation
- Environmental sustainability
- Clean energy
- Advanced manufacturing
- Biomass

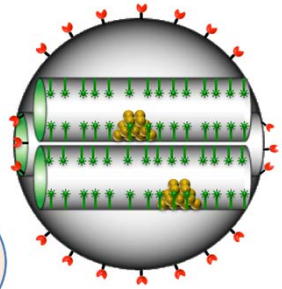
National an Homeland Sec S&T

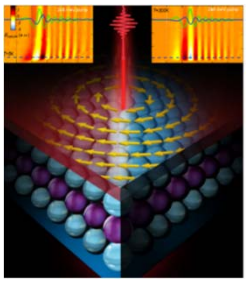
- Critical infrastructur protection and resili
- Nuclear nonprolifera
- Physical defense sy

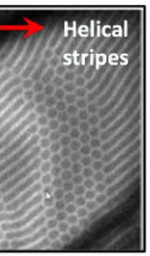
Laboratory accelerates materials design, discovery and deployment by transitio
science to applied science to technology commercialization

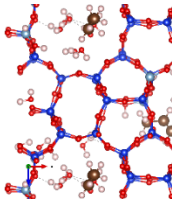


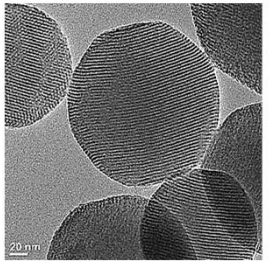


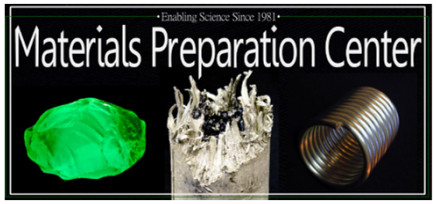


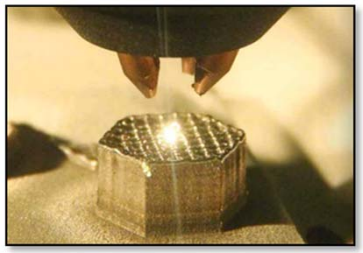


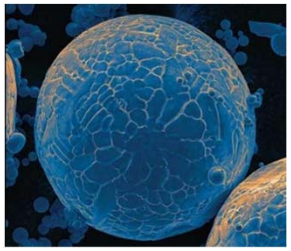












AMES LABORATORY

U.S. DEPARTMENT OF ENERGY

CMI Critical Materials In
AN ENERGY INNOVATION HUB

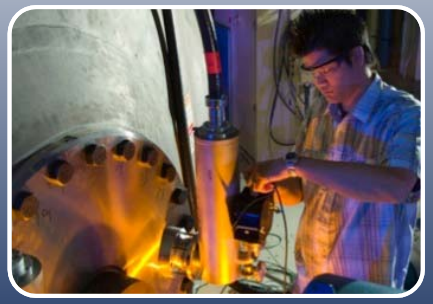
LLNL's mission is to strengthen national security through world-class science, technology, and engineering

Stockpile Stewardship

All-WMD Threat Reduction

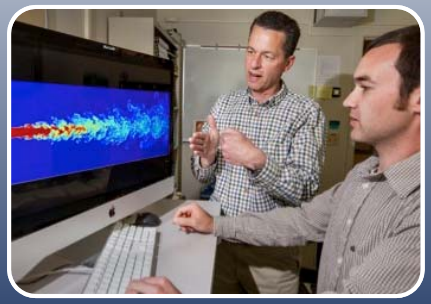
Multi-Domain Deterrence

Energy and Climate Security



Science

Engineering

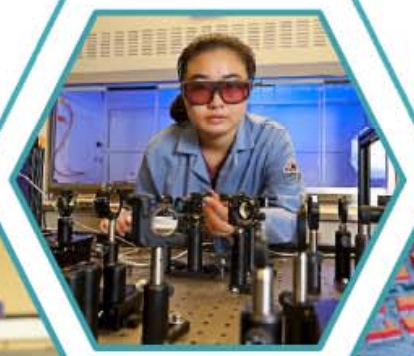


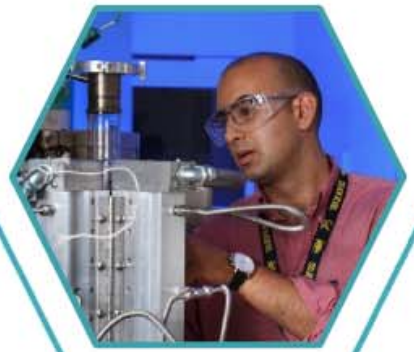
Computing

NL's goal:
e world's premier
earch institution

Conduct world-leading research

Deliver innovative break-throughs





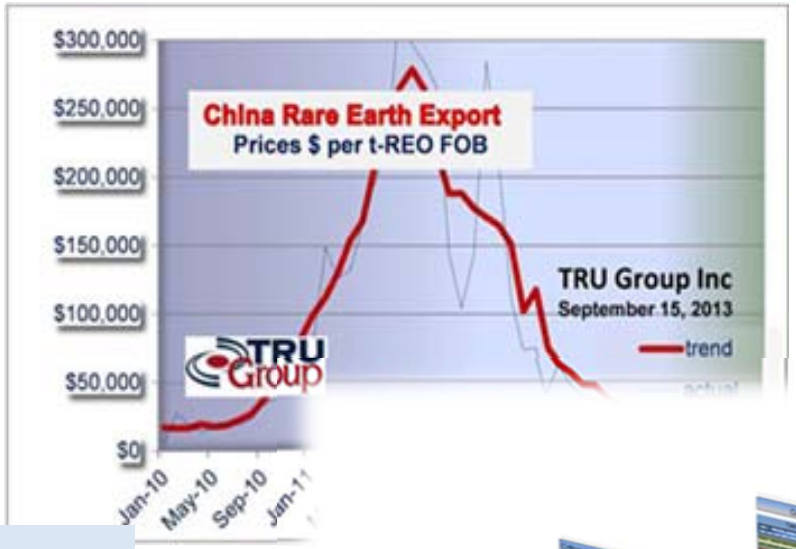
Ensure national security

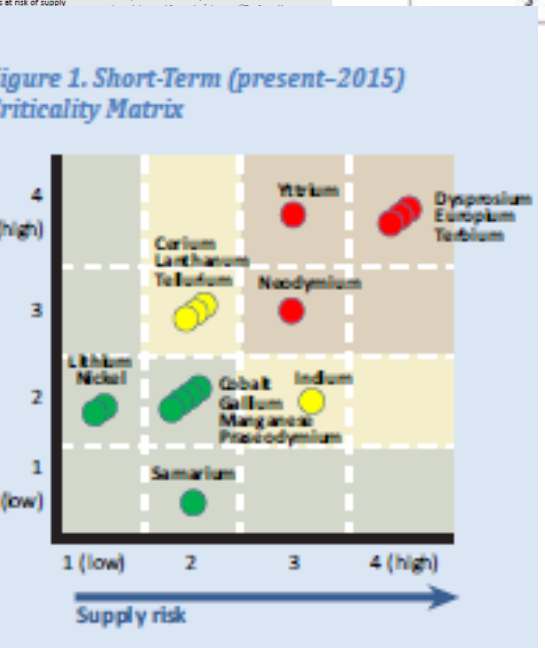
Secure energy future

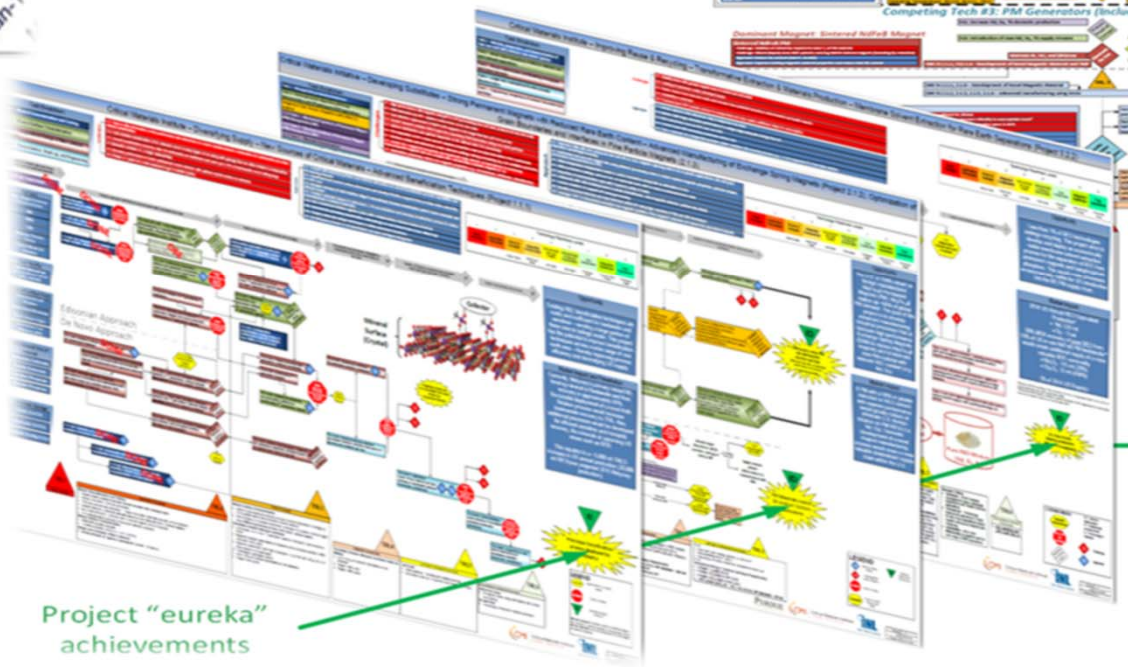
ORNL's distinctive facilities bring thousands of R&D partner
Tennessee each year - Building Technologies Research and Integration C
Carbon Fiber Technology Facility; Center for Nanophase Materials Sciences; High F
Isotope Reactor; Manufacturing Demonstration Facility; National Transportation Res
Center; Spallation Neutron Source; Oak Ridge Leadership Computing Facility

IDGE
aboratory

e Earths Element Uncertainty







Enables domestic
energy develop